~~CONFIDENTIAL~~ COPY NO. 92

FOR THE CHIEF, CIA LIBRARY

~~SECRET~~
SECURITY INFORMATION

02-0300

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

EXTERNAL RESEARCH STUDIES
CIA/RR ER-2

DEFORMATION OF THE CRUST OF THE EARTH AND TERRESTRIAL MAGNETISM

25X1A5a1

[redacted]

18 OCTOBER 1951

~~SECRET~~

WARNING

THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES, WITHIN THE MEANING OF TITLE 18, SECTIONS 793 AND 794 OF THE U. S. CODE, AS AMENDED. ITS TRANSMISSION OR REVELATION OF ITS CONTENTS TO OR RECEIPT BY AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

Approved For Release 1999/09/02 : CIA-RDP79-01083A000100020001-6

[redacted]

[redacted]

25X1A5a1

[redacted]

Series B

Intelligence Notes on the Problem of Soviet Capabilities
in Geophysics, Oceanography, Aerology, etc.

Number 1

DEFORMATION OF THE CRUST OF THE EARTH
AND
TERRESTRIAL MAGNETISM
(CIA/RR ER-2)

25X1A5a1

[redacted]

25X1A5a1

[redacted]

18 October 1951

(CIA Project ORR 63-51)

[redacted]

FOREWORD

External Research Study, Number 2 (CIA/RR ER-2), "Deformation of the Crust of the Earth and Terrestrial Magnetism," is the second of the reports originating from CIA Project ORR 63-51, "The Problem of Soviet Capabilities in Geodesy and Cartography," [redacted] 25X1A5a1

25X1A5a1 Series B, intelligence notes on geophysics, oceanography, aerology, etc., consists of significant materials and information on developments, trends, new theories, and techniques uncovered in the course of research on the main subject of the project.

REPORT NO. B 1

DEFORMATION OF THE CRUST and MAGNETIC FIELD

In the present report an analysis of two Russian books is given. These books are not generally available. The first volume, containing the proceedings of a conference on the terrestrial crust, has rather trivial contents. Much more detailed discussions on the same problems and by the same authors are available in open source material. The book is, however, very often quoted in Russian scientific literature, and it was considered worthwhile to give an English translation of the titles of individual articles with a few comments.

The other volume, on the magnetic field of the U.S.S.R., has potentially a tremendous significance inasmuch as it necessitates a complete revision of our information on the subject.

Trudy Soveshchaniya po Metodam Izucheniya Dvizheniy i Deformatsiy Zemnoy Kory (Proceedings of a Conference on the Methods of Study of Movements and Deformation of the Crust of the Earth).
Geodezizdat, Moscow, 1948, pp. 261
V. V. Belousov and V.V. Danilov, editors.
Original obtained through ACIS, No. AF347935.

The conference was held in December 1944 on the initiative of the Seismological (new Geophysical) Institute of the Academy of Sciences and of the Central Research Institute of Geodesy, Aerial Surveys and Cartography. The book consists of a number of articles, a short account of which is

as follows:

pp. 7-21 (1) V.V. Belousov: Oscillatory movements of the terrestrial crust, their development, characteristics and the problems of their investigation. This article is a summation of a number of articles on the same subject by the author. The point of view is distinctly geological and general; that is, the whole world is considered rather than only the U.S.S.R.

pp. 22-46 (2) N.N. Nikolayev: Present tectonic movements in the territory of the U.S.S.R. and geological methods of their study.
The author attempts to summarize very numerous investigations on this subject published in the U.S.S.R. This summary is part of the work carried out at the TsNIIGAiK dealing with the influence of movements of the terrestrial crust on the results of precise geodetic measurement. Of especial interest are two maps of the U.S.S.R. One represents a scheme of recent (geologically) tectonic activity in which 12 regions are distinguished. The other is the scheme of present manifestations of tectonic activity in which 18 regions are outlined.

pp. 47-68 (3) K.M. Markov: Geomorphological methods of study of the movements of the terrestrial crust.
The point of view is general although a few examples from the U.S.S.R. are discussed.

pp. 69-79 (4) V.P. Zenkovich: Methods of determination of vertical movements from coastal morphology.
Same remark as in (3).

pp. 80-90 (5) E.A. Mudretsova: Isostasy and its role in the deformations of the terrestrial crust.

A study of the gravitational field of Central Asia with maps of gravity anomalies.

pp. 91-107 (6) A.A. Izotov: Possibility of the study of present movements of the terrestrial crust by geodetic methods.

General treatment.

pp. 108-117 (7) V.V. Danilov: Some results of geodetic measurements of the deformation of the terrestrial crust obtained abroa

General treatment.

pp. 118-142 (8) V.P. Shcheglov: World determinations of longitude as a method for the study of the motion of continents.

Analysis of the world longitude determinations of 1926 and 1933.

No evidence of change of longitude.

pp. 143-148 (9) A.Ya. Orlov: On the variation of latitude at Batavia, Java.

Part of a study by the same author of the variation in the position in the rotational axis of the earth based on results of the International Latitude stations.

pp. 149-156 (10) E.N. Aksent'yeva: Results of the eleven-year series of observations on the crust tide, M_2, by means of horizontal pendulums at Poltava from 1930 to 1941.

Study of the main lunar, semi-diurnal wave in the tide in the crust of the earth.

pp. 157-174 (11) N.N. Pariyskiy: Irregularity of the rotation of the Earth and its deformations.

General treatment.

pp. 175-182 (12) Yu.D. Bulanzhe: On the secular variations of the force of gravity.

The results previously obtained by Abakelia (1936) on significant variations of gravity with time are questioned. A new reduction of the value of gravity for 14 gravimetric stations in the Caucasus, made during 25-32 years agree within their mean errors. Determinations at Washington, D.C., are also considered. At present there is no indication of secular variation.

pp. 183-197 (13) E.F. Savarenskiy: Deep focus earthquakes and deformations of the terrestrial crust.

General treatment.

pp. 198-232 (14) V.A. Magnitskiy: Geodetic data on the condition of matter in the upper layer of the Earth.

General treatment.

pp. 233-241 (15) G.P. Gorshkov: Tectonic earthquakes.

General treatment. The Geophysical Institute is sending an expedition to one of the active earthquakes regions in Central Asia. The purpose of this expedition is the study of the geological history of the region, establishment of repeated precise geodetic measurements, gravimetry, magnetic field, tilt of the ground, etc.

pp. 242-251 (16) A.N. Zavaritskiy: On the study of movements of terrestrial crust in Kamchatka.

The author complains of the paucity of concrete data for this

problem. It appears that at the time of the article (that is, 1944) there were no gravimetric measures in Kamchatka. Map of epicenters of earthquakes.

pp. 252-261 (17) V.F. Bonchkovskiy: Methods of measurement of the tilt of the earth and some results of these measurements. Reference to systematic observations of the tilt by the Seismological Institute in Alma-Ata.

MAGNETIC FIELD OF THE U.S.S.R.

The Research Institute of Terrestrial Magnetism (N.I. Institut Zemnogo Magnetizma) of the U.S.S.R. is publishing a series of volumes under the general title of the Magnetic Field of the U.S.S.R. (Magnitnoye Pole S.S.S.R.). A photostat of Volume 2, part 1, published in 1947, has been sent to this laboratory by the Aeronautical Chart and Information Service (No. AF296104). This photostat contains 328 pages, and gives magnetic data reduced to the epoch of 1940 for about 22,000 points in the U.S.S.R.

These data are the result of the general magnetic survey of the U.S.S.R. carried out by some 400 expeditions in the years 1931-1942. At the end of Volume 2, part 1, a list of 413 sources is given, with a definite statement that only a few of the results have been published. The great majority of data is derived from manuscripts of reports of expeditions deposited in the archives of the Institute of Terrestrial Magnetism. Therefore the present volume gives us information on the magnetic field of the U.S.S.R. which has been heretofore unknown not only in the U.S.A. but also in the U.S.S.R.

From the preface to Volume 2, part 1, the following information can be gathered:

In the densely populated regions (mostly in European Russia and East-Central Siberia) the points at which absolute determinations of magnetic elements were made were about 20 klm. apart forming a network. In this territory there were also points 1 or 2 klm. apart, at which relative determinations of the vertical component of magnetic force were made.

In other parts of the U.S.S.R., (Central Asia, Northern and Eastern Siberia), the determinations were made at points about 20 klm. apart along certain directions, usually along rivers and roads.

Along with absolute determinations of magnetic elements at 22,000 points, repeated observations were made at a network of selected stations in order to determine secular variation of the elements.

The entire series will consist of 5 volumes, of which volumes 1 and 2 have already been published:

Volume 1. Purpose, organization and performance of the survey, methods of treatment of data, methods of representation, utilization of data, etc.

Volume 2. Numerical results.

Part 1. General systematic catalogue of the magnetic survey of 1931-42.

Part 2. Catalogue of repeated observations at magnetic observatories and selected points of the general survey for the determination of secular variation.

Part 3. Alphabetical list to the general catalogue.

Volume 3. Results of magnetic determinations made in some parts of the Union between 1900 and 1930 and therefore not covered by the general survey and also determinations in territories which entered the Union after 1939.

Volume 4. Atlas of charts of magnetic elements.

Volume 5 and perhaps others: Results of relative determination of the vertical component and results of the general survey after 1942.

The work has been carried up to latitude 75°N. Many determinations in the Arctic regions have not been included in the catalogue even though they were made south of that latitude, apparently because they were not part of the planned survey.

In an article by H. E. Malinina, Magnetic Field of Western Siberia (Izv. Ak. N., Ser. Geogr. i Geofiz., Vol. 11, 1947, No. 1) we find the following details. There are more than 100,000 relative determinations of the vertical component of magnetic force in the U.S.S.R. For Western Siberia to meridian 76°E, the available data are:

Absolute determinations	4116
Relative determinations	24457
Total	28573

There is available a map of the vertical component for European Russia on a scale of 1:420,000 and for the rest of the territory on a scale of 1:1,000,000.

From the table of contents of the series "Magnitnoye Pole SSSR" it

appears that Volume 2, part 2, giving the secular variation of the magnetic elements is most important, and all efforts should be made to obtain it.

Our present knowledge of the magnetic field in the U.S.S.R. is evidently in a very unsatisfactory condition. A check up on some regions in Eastern Siberia on the World Aeronautical Chart (the magnetic data for which are furnished by the Coast and Geodetic Survey) reveal errors of more than 2° in magnetic declination. The two volumes of the Carnegie Institution (No. 578, 1946 and No. 580, 1947) on the Geomagnetic field shows very slight acquaintance with Russian sources. However, no matter what has been done before in this respect, the availability of this Russian magnetic survey, hitherto unknown, calls for a complete revision of our ideas on this subject.

We have also available a catalogue by B. P. Veynberg published in 1929 and giving magnetic data for the U.S.S.R. up to 1926 and another catalogue by the same author giving data for the Arctic regions up to 1932. There is also a supplement catalogue by Veynberg, so far not found, which completes these data to the year 1933. We still have a small gap (1926-1931) to bridge insofar as our information on magnetic measurements in the U.S.S.R. is concerned.

~~CONFIDENTIAL~~
~~SECRET~~

Approved For Release 1999/09/02 : CIA-RDP79-01083A000100020001-6